HAZARD ANALYSIS (Beryllia printed circuit boards)

Description of Work: Assembly, testing and repair of electronic circuits assembled on top of beryllia printed circuit boards, specifically the SVX Port Card and hybrids. This description DOES NOT include the actual machining of the boards which has to be done at off-site locations.

Step/Phase of Job	Safety Hazard	Precautions/Safety Procedures
Training	Untrained worker executing operations with the beryllia boards that could cause health problems to himself/herself or to colleagues.	Everyone that will be working with the beryllia boards has to take the ES&H Beryllium Handling course and read section 5052.5 "Special Toxic Hazards – Beryllium and Beryllium Alloys, Chronic Beryllium Disease Prevention Program" of the Fermilab ES&H Manual.
Characterization of the boards	Inhalation of beryllium dust, physical contact and ingestion.	The surface oxidation of the boards shall be below 0.025 $\mu g/cm^2$. The Computing Division Senior Safety Officer can determine this concentration.
Labeling	Mishandling the beryllia boards	Whenever possible, the boards shall be labeled. In addition, labeling of the working area, waste cans and bags has to follow the instructions described in the ES&H Manual.
Storage	Inhalation of beryllium dust, physical contact and ingestion.	All beryllia boards shall be stored in labeled, sealed containers inside a locked cabinet or drawer. The cabinet or drawer shall have proper labeling.
Handling the boards	Inhalation of beryllium dust, physical contact and ingestion.	Always use latex gloves. Minimize the exposure to beryllium. Wash hands after handling the boards. If possible, always wipe the boards and working areas with alcohol pads.
Disposal of glove, wipe pads or any other item that may be contaminated by beryllium dust	Inhalation of beryllium dust, physical contact and ingestion.	Use special waste cans specifically assigned for this purpose. Contact Mike James or Amy Pavnica for removal of beryllia waste.
Solder flux cleaning	Sink water contamination	Do not throw the liquid residues resulting from solder flux cleaning into the sink. Dispose them into special containers assigned for this purpose. To avoid risk of spill on the floor, the container has to be inside a secondary waste container. Contact Mike James or Amy Pavnica for removal of the container.
Disposal of beryllia pieces	Inhalation of beryllium dust, physical contact and ingestion, misplaced beryllia boards.	Amy Pavnica, the Computing Division Senior Safety Officer, will handle the disposal of the pieces.
Cutting, scraping, soldering, micro-bonding, etc.; any process that could generate beryllium dust or fumes	Inhalation of beryllium dust or fumes, physical contact and ingestion.	Any process that could result in the generation of beryllium dust or fumes, or result in the board being heated to more than 900°C in moist atmospheres, requires the consent of Amy Pavnica, the Division Senior Safety Officer.

Inventory	Misplace beryllia boards	Yuri Gotra is responsible for maintaining an inventory of all Port Cards. Any piece that is removed from Yuri's area has to be logged. Any missing Port Card shall be located within one week or Amy Pavnica, the Computing Division Senior Safety Officer, shall be notified. Inventory of hybrids shall be made by assigned personnel from the PPD division.
Accident where beryllia pieces shatter.	Inhalation of beryllium dust	Evacuate and secure the area. Call emergency (x-3131) to report a Beryllium spill.
Port Cards taken to other locations inside Fermilab	Mishandling and misplacing of beryllia	ESE Department workers or collaborators shall inform other workers if beryllium is present in parts supplied to the workers and shall inform the workers of the potential hazards in handling beryllia boards.

Accepted:_____ **Date:_____**

Supervisor/Task Manager